Original instructions

Dalton

Process lock

2TLC172165M0201, rev. A

ABB AB / Jokab Safety Varlabergsvägen 11, SE-434 39, Sweden
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CE

The Dalton process lock complies with CE provisions according to the following directives:

EMC Directive	2004/108/EC

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USER'S MANUAL:

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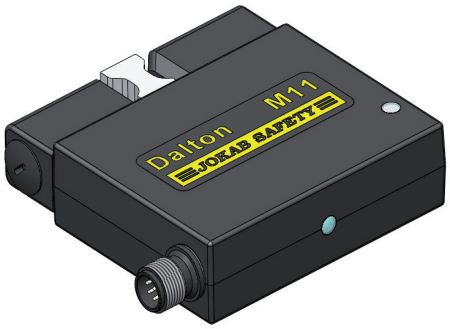
1 Dalton - the intelligent process lock

Dalton is a locking unit that is intended for use in preventing unnecessary production stoppages, i.e. it is not a safety lock. It can be used either as a stand-alone lock or integrated with Eden (as a safety sensor). In the unlocked state the door is held closed by a ball catch and locked mechanically. If necessary, the holding force of the ball catch can be adjusted. The unit only permits locking if the ball catch is secured and when Eva is in contact with Adam (depending on variant). When the lock input is set, the ball catch is locked.

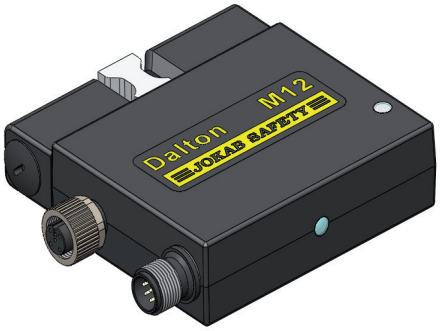
Dalton is easily connected with an M12 connector. A Tina junction block may also be used for distribution of the safety as well as locking functions. The Dalton status is indicated by LEDs and can also be read by PLC via the information output.

1.1 Basic versions

Four major versions of Dalton are available and can be combined with several mounting brackets. There are different types of Dalton depending on the actual requirements. The L-type is a ball catch without internal electronics. The M-type is a process lock with power to lock. There is a possibillity to choose between three versions of the M-type. Two versions with 8-pole connectors. The Dalton M11 without possibillity for connecting Eden and Dalton M12 with a 5-pole connector for Eden and easilly distributed back to the electrical cabinet with the 8-pole cable including the functions needed controlling the Dalton. The M31 has a 5-pole connector (otherwise the same as M11) and the L00 version is without internal electronics.

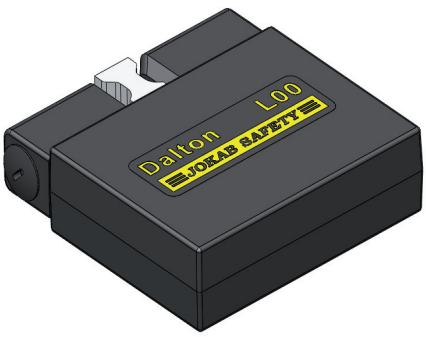


Dalton M11



Dalton M12

Dalton M31



Dalton L00

2 General information

2.1 Installation precautions

The Dalton lock shall be installed by trained personnel following the Safety regulations, standards and the Machine directive. All safety functions shall be tested before the starting up of the machine.

2.2 Maintenance

Before performing maintenance - Do not open the Dalton prior the warranty has elapsed. Opened units will not be given warranty if claims are made.

The ball-catch is lubricated from factory. More lubrication can be added when needed. Dismount the end caps and adjustment screws. Remove the springs, pistons and balls. Add grease on the ball seat, springs, pistons and balls.

Remount the details.

Warning! The piston o-rings may not be damaged. This will have an negative effect on the IP-rating.

2.3 Caution!

This product shall be handled with caution. The product should be replaced with the same type of product if there is a situation where it has been dropped on the floor, knocked strongly, exposed to extreme voltages, temperatures or humidity beyond the specified limits. Dalton may never be used as a door stop.

2.4 In case of functional problems

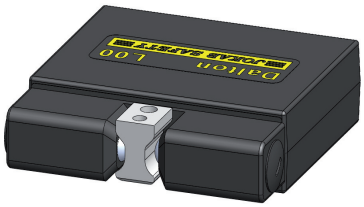
The entire system should be tested without disconnecting the power supply. Check the LED indicators according to ”Indication and information” under the chapter ”Technical data“ in this manual. If the problem is not solved, please contact the nearest ABB/Jokab Safety Service Office or reseller.

2.5 Force to open

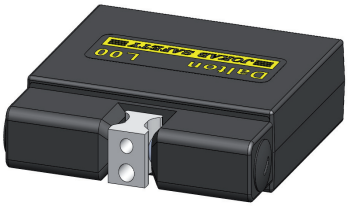
Do not attempt to force the lock open while Dalton is locked, as it will cause permanent damage to the device.

3 Mechanical design

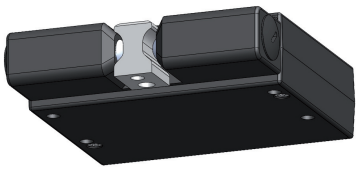
Depending on the mounting brackets, the Dalton can be mounted with opening from two or three directions. These three directions are shown below and will be mentioned further on in the text.



Top



Front

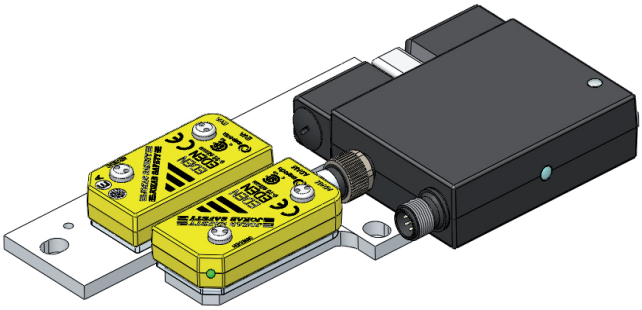


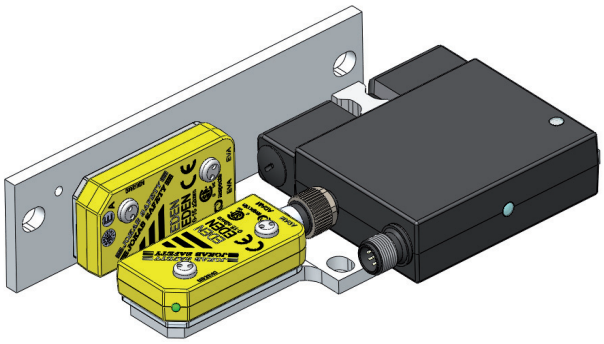
Bottom

3.1 Opening directions

The mounting brackets are designed to make it possible to adjust the position of the tongue in the ball-catch.The ball-catch may not be in tension with the tongue when the lock is to be activated. This is to ensure function without problems.

Note! Dalton may never be used as a door stop.



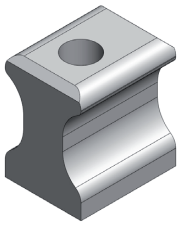


Only two opening directions with this kind of mounting bracket (Bottom and Front).

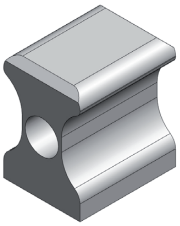
3.2 Detection of tongue

To ensure that the Dalton will be able to detect the tongue the right type of tongue has to be selected. For approach from Front select tongue A and for approach from Top and Bottom select tongue B. Any of the two tongues can be used for either operating direction when used together with Dalton L00.

The tongues are recognised by their physical marks (see pictures bellow).



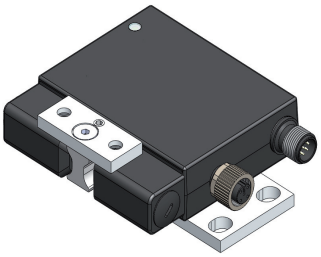
Tongue A

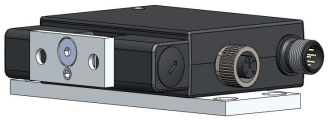


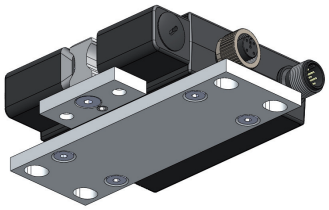
Tongue B

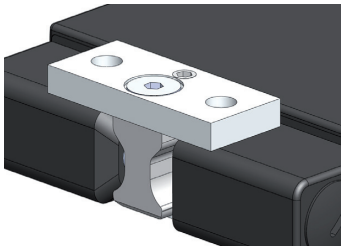
3.3 Location of tongue towards Dalton

The tongue has to be mounted correctly to ensure optimized detection towards Dalton. The smallest of the two screws on the back side of the mounting bracket for the tongue must always be heading towards Dalton or downwards (see pictures below).







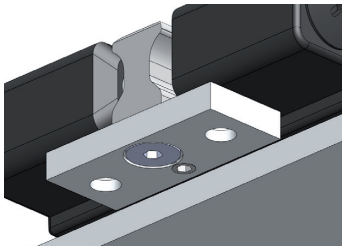


Top

(Tongue B)

Front

(Tongue A)

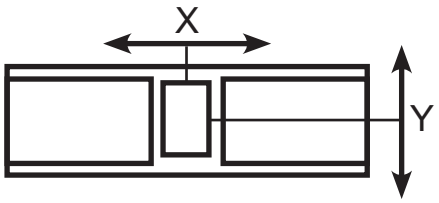


Bottom

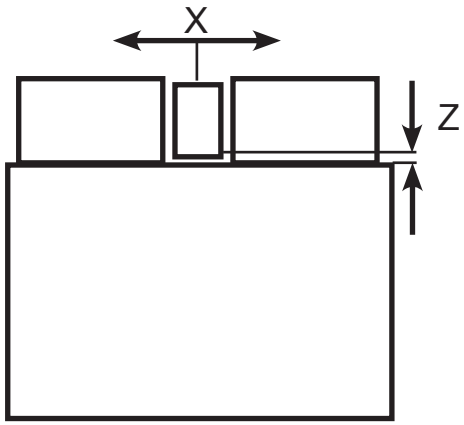
(Tongue B)

3.4 Adjustment of tongue

When the door is closed the balls of the ball-catch must not be pressed by the tongue. The lock has to be mounted so that the tongue is well centered in the ball-catch in the X-direction and within the measurements stated for the Y- and Z-directions. When the balls are under pressure, the lock will not work reliably and the dust and liquid protection is reduced.



Front

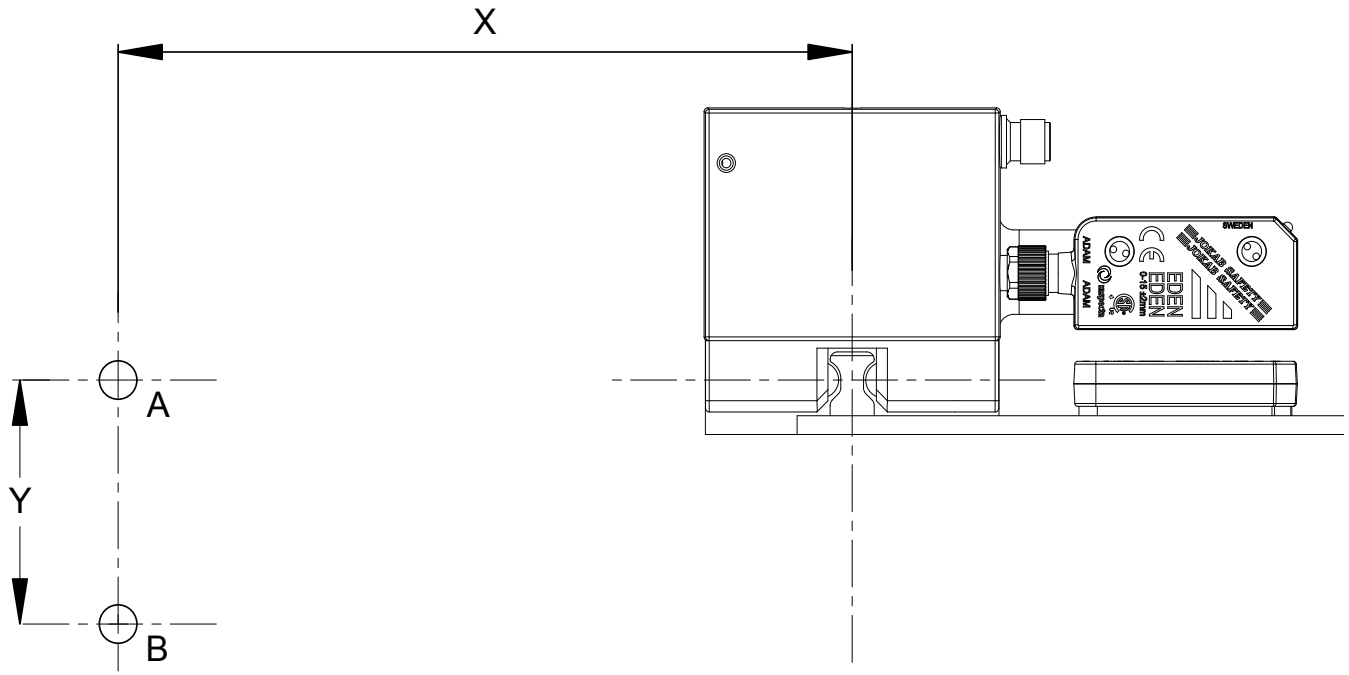


Top, Bottom

X: +/- 0,6 mm
Y: +/- 5 mm
Z: Min 2 mm, max 4 mm

3.5 Distance from hinge to tongue

If the axis of the hinge (A) is in line with the centre of the ball-catch the tongue can be mounted at a short distance (X) between the hinge and tongue. If instead the axis of the hinge (B) is outside the centre of the ball-catch (with the distance Y) the distance (X) between hinge and tongue also must be increased.

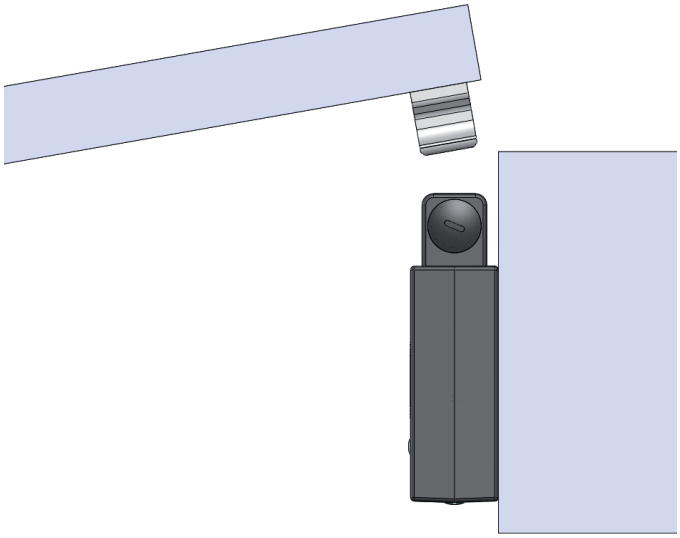


X	Y
100	4
200	10
300	15
400	20
600	30
800	40
1100	50

3.6 Vertical installation

- or horizontal on hatch opened upward or downward

The figure shows the optimized way to mount Dalton in situations with a narrow radius.

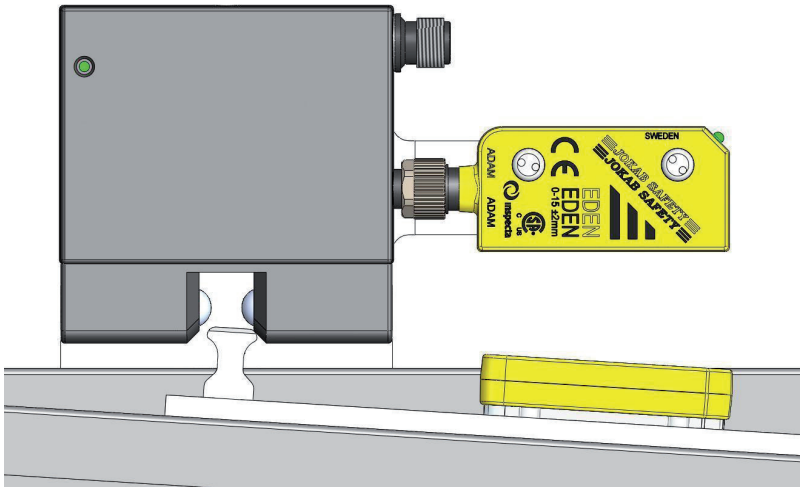


3.7 Horizontal installation

- or vertical on a hatch opened upward or downward

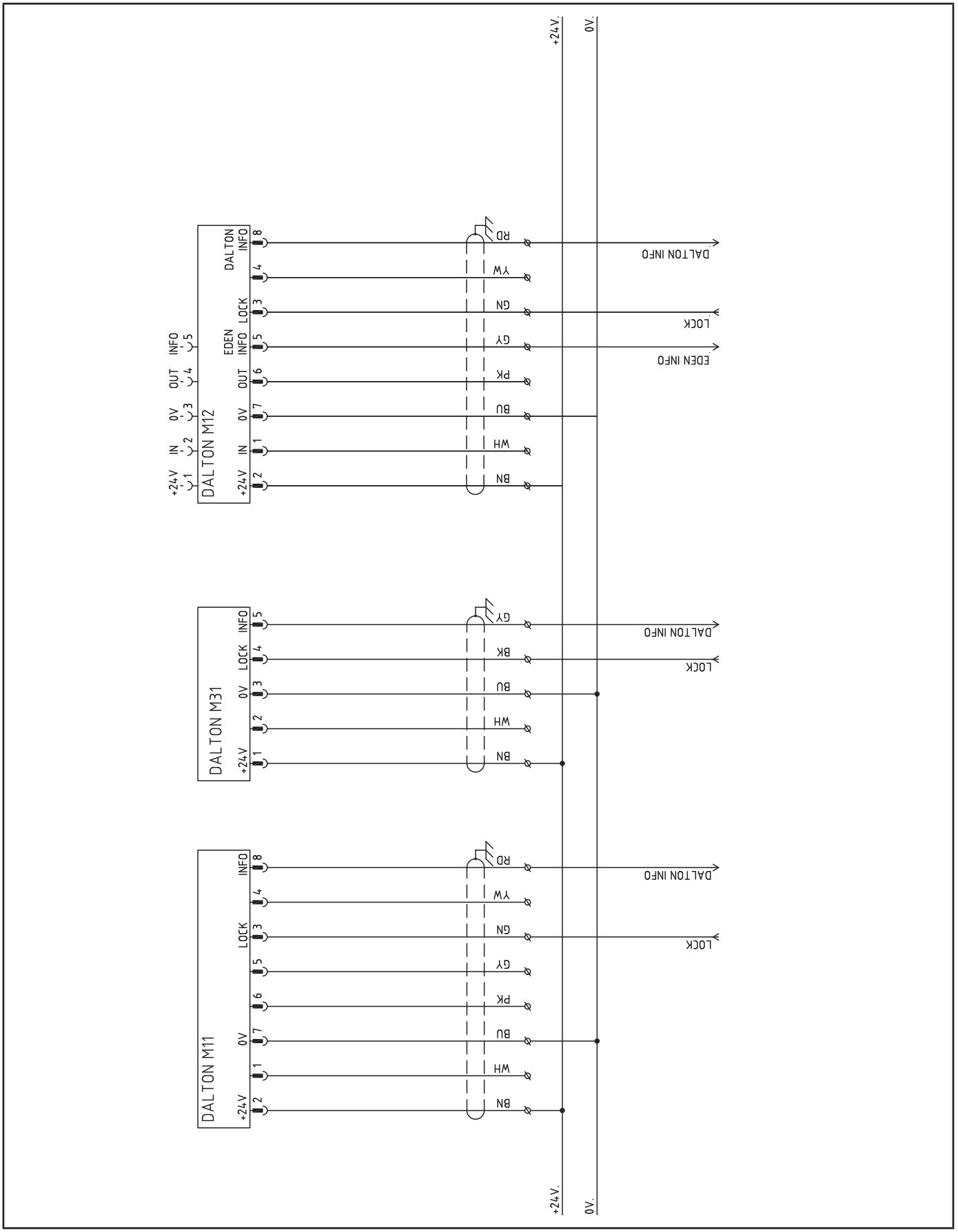
If the only possibillity is to mount the Dalton horizontally, the following aspects has to be considered:

If the door hinge is not in line with the centre of the balls a side movement between ball-catch and tongue will be introduced when the door is closing (see picture below).



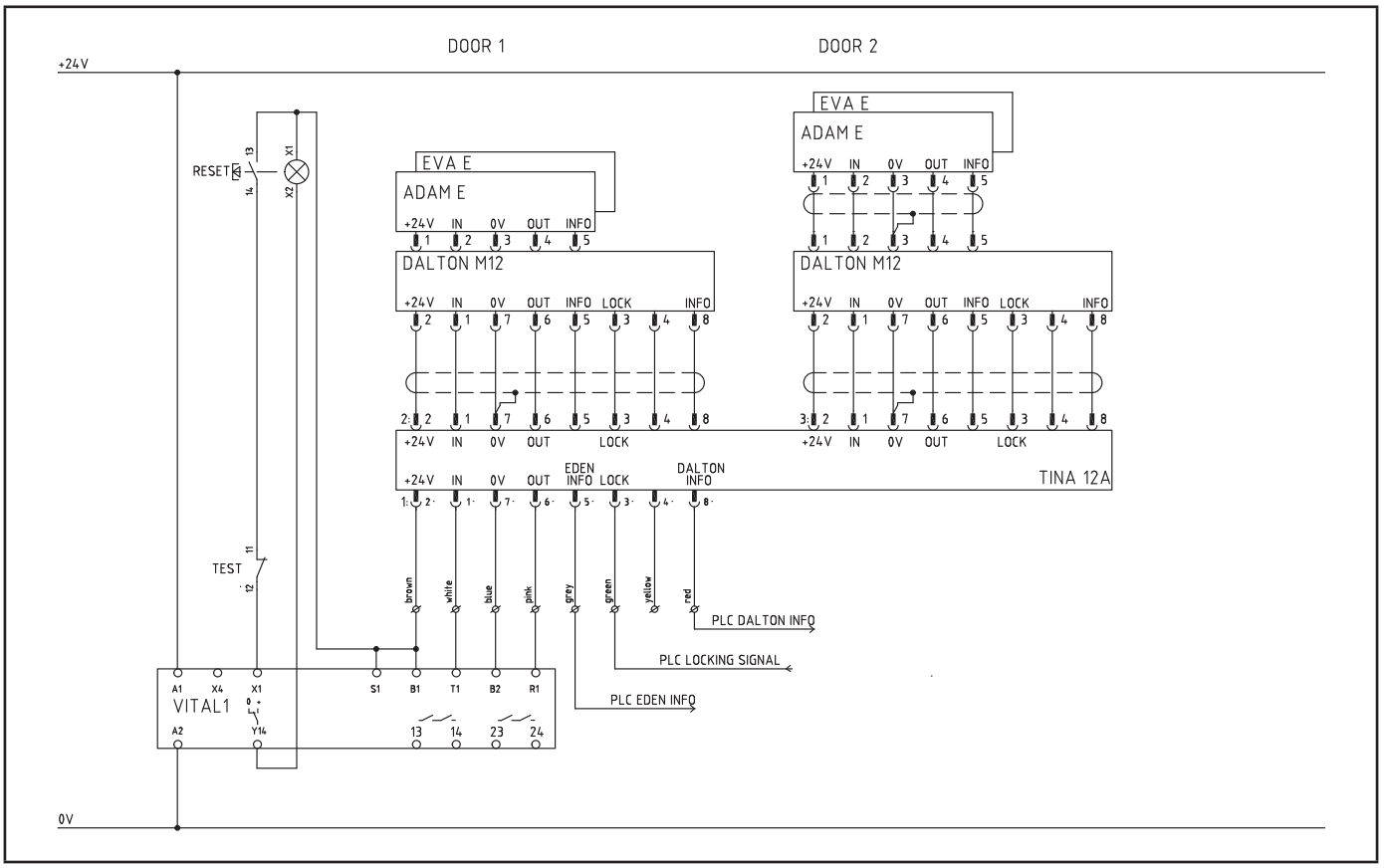
Caution! The tongue may never under any circumstances touch anything else than the balls in the ball-catch when the door is closing, otherwise the lock will be damaged.

4 Electrical connections

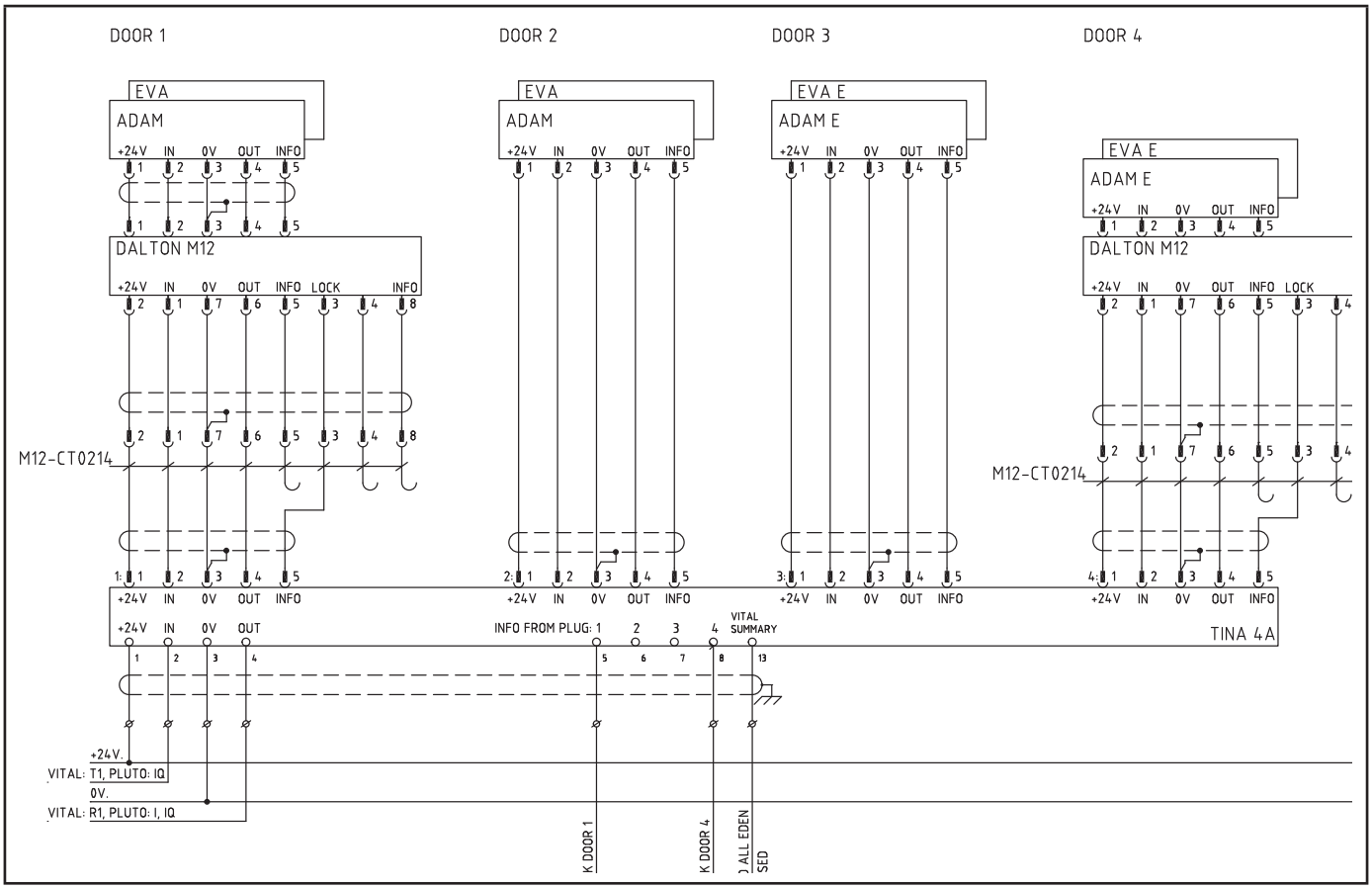


5 Connection examples

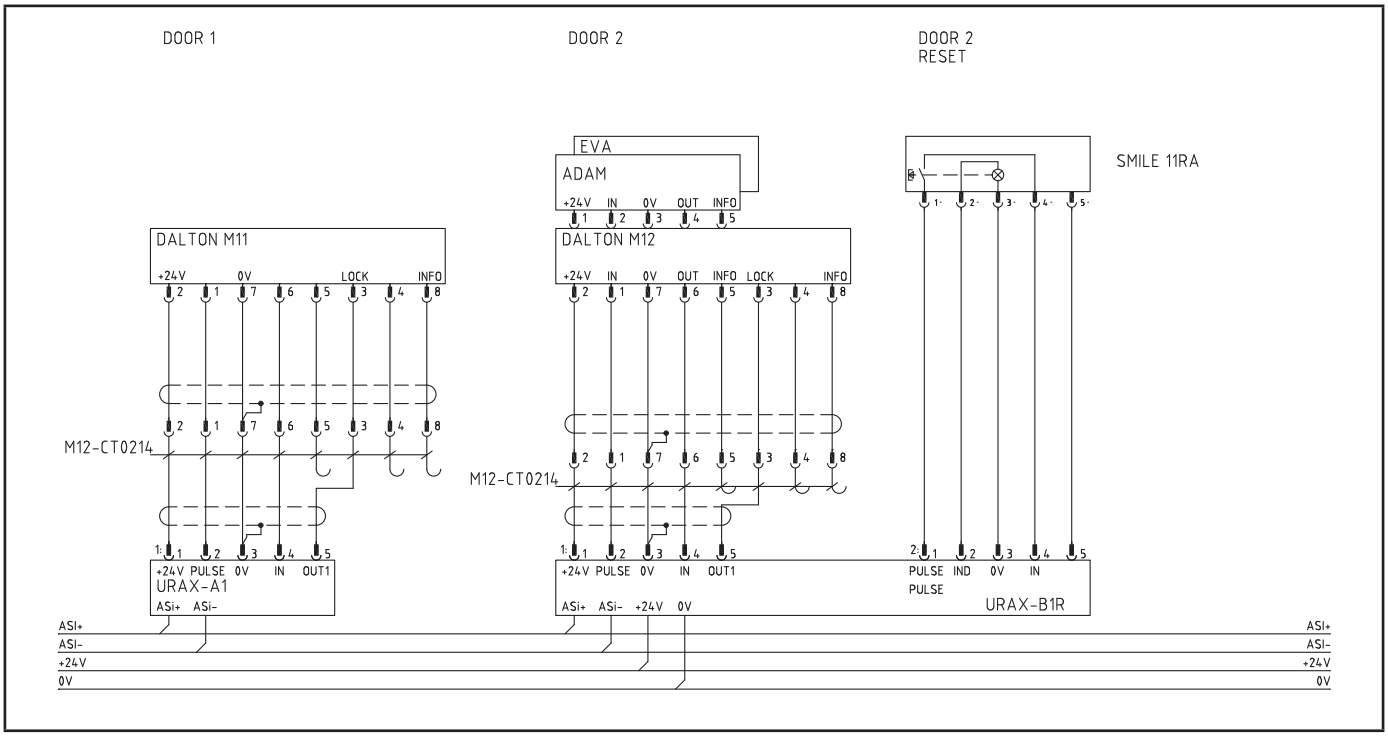
Example with Dalton M12, Tina 12A and Vital 1:



Example with Dalton M12 and Eden connected via Tina 4A:



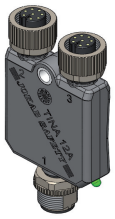
Example with Dalton M12 and Eden connected to Urax (AS-i):

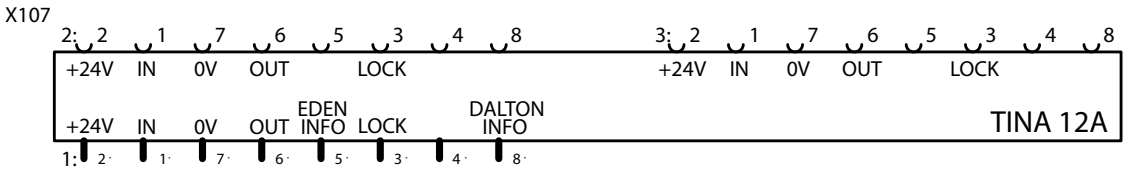


6 Distribution blocks and special cables

6.1 Distribution block Tina 12A

Tina 12A can be used to connect two Dalton units combined with Eden with one cable connected to the electrical cabinet. The status of both Eden units are indicated on the two LEDs on the Tina 12A unit . Summed information from the two Eden and Dalton units can be connected to PLC from the information output on Tina 12A.

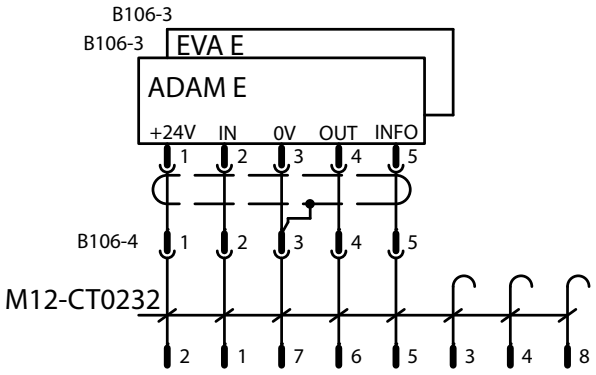


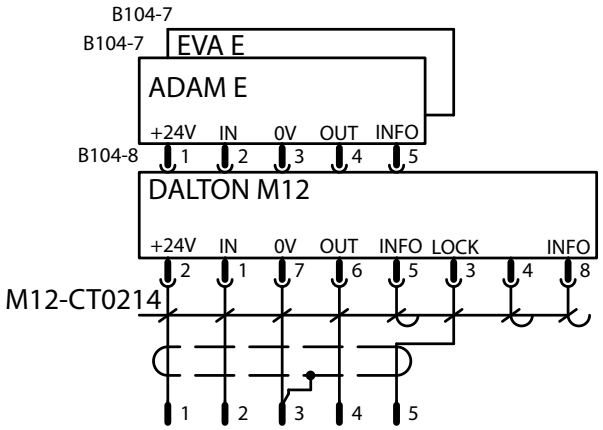


6.2 Transfer cables

Transfer cables can be used when it is needed to convert 8-pole to 5-pole or vice versa. The M12-CT0214 makes it possible to connect the 8-pole connector on Dalton to a 5-pole connector. The information from Dalton and Eden will be lost when a transfer 8-pole to 5-pole cable is used. The locking signal is redirected to pin-5 and the supply and safety from pin-1 to pin-4.

The M12-CT0232 gives the possibillity to connect a single Eden to the 8-pole connection of the Tina 12A.





7 Dalton in combination with brackets

7.1 The basic Dalton versions

Dalton M11	2TLJ020038R3100	8-pole male connector Weight: 306 g

Dalton M12	2TLJ020038R3200	8-pole male connector, 5-pole female connector for Adam Weight: 316 g

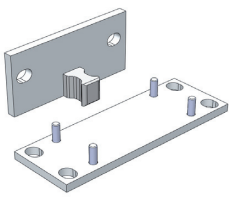
Dalton M13	2TLJ020038R3300	5-pole male connector Weight: 306 g

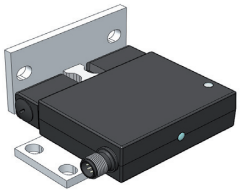
Dalton L00	2TLJ020038R3000	Ball-catch only, no electrical functions Weight: 188 g

Note! Eden is not included in any version of Dalton. Eden has to be ordered separately.

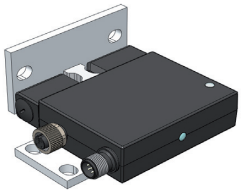
7.2 Mounting brackets for Dalton

Bracket 1	2TLJ020039R0000	Mounting bracket for Dalton only Weight: 110 g

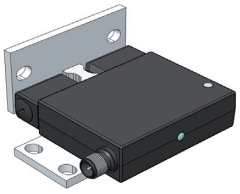




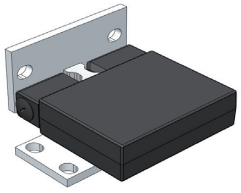
Dalton M11



Dalton M12



Dalton M31

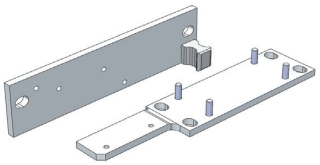


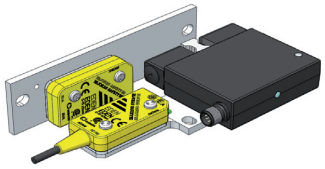
Dalton L00

7.3 Mounting brackets for Dalton and Eden

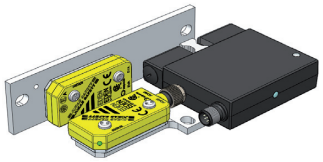
Bracket 2 2TLJ020039R0100 Mounting bracket for Dalton & Eden

Weight: 172 g

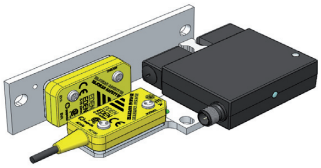




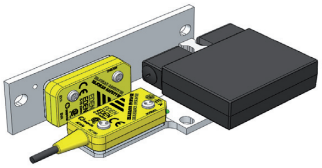
Dalton M11



Dalton M12



Dalton M31

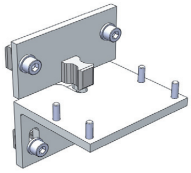


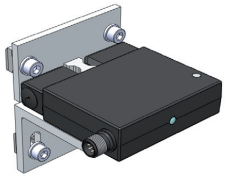
Dalton L00

7.4 Mounting brackets for ABB/Jokab Safety Quick-Guard fence

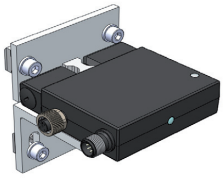
Bracket 3 2TLJ020039R0200 Mounting bracket for ABB/ Jokab Safety Quick-Guard fencing system, for Dalton only

Weight: 180 g

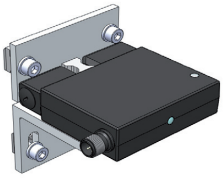




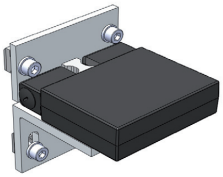
Dalton M11



Dalton M12



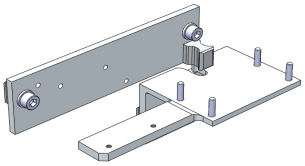
Dalton M31

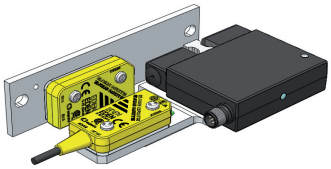


Dalton L00

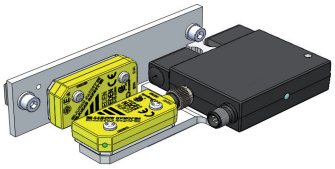
Bracket 4 2TLJ020039R0300 Mounting bracket for ABB/ Jokab Safety Quick-Guard fencing system, for Dalton & Eden

Weight: 220 g

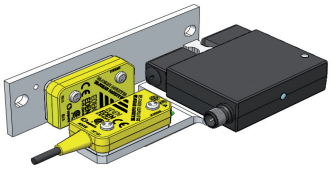




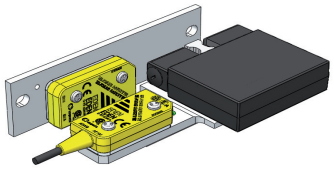
Dalton M11



Dalton M12

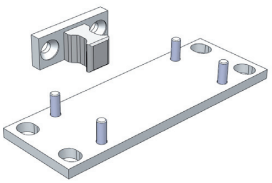


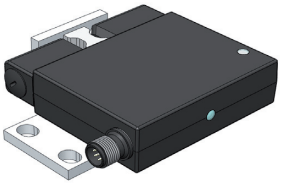
Dalton M31



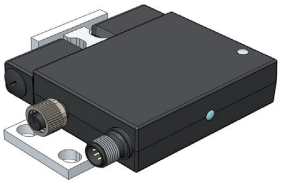
Dalton L00

7.5 Mounting brackets with small bracket for tongue

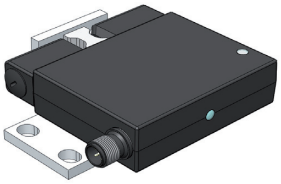
Bracket 5	2TLJ020039R0400	Mounting bracket for Dalton only, small bracket for tongue Weight: 74g	



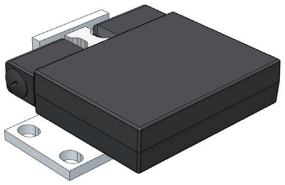
Dalton M11



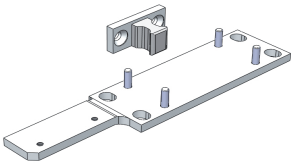
Dalton M12

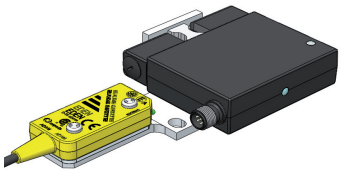


Dalton M31

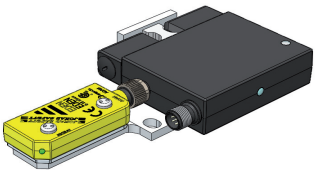


Dalton L00

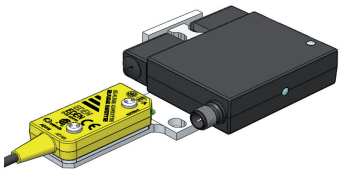
Bracket 6	2TLJ020039R0500	Mounting bracket for Dalton & Eden, small bracket for tongue Weight: 102g	



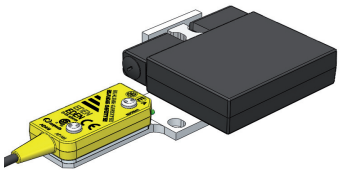
Dalton M11



Dalton M12



Dalton M31



Dalton L00

7.6 Tongue

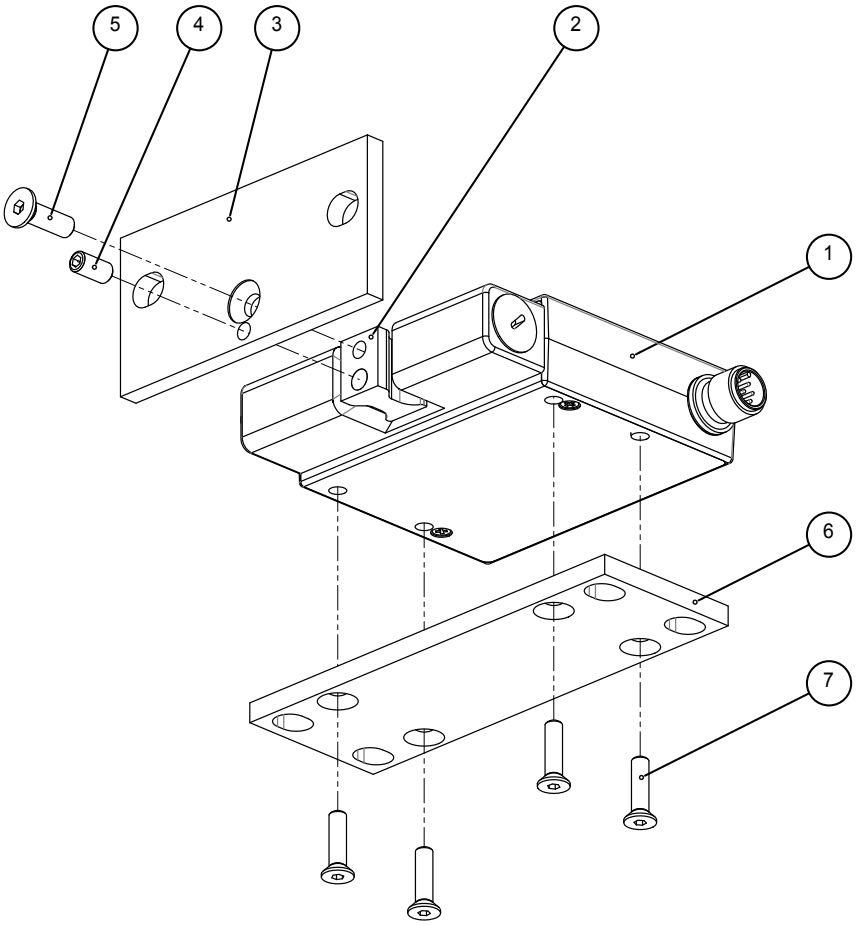
Tongue A	2TLJ020039R0800	Tongue for detection Front

Tongue B	2TLJ020039R1000	Tongue for detection Top, Bottom

For Dalton L00 both lock tongues can be used regardless of the operating direction.

Note! To get a complete Dalton remember to order:
Dalton XXX + Bracket + Tongue + Eden (optional)

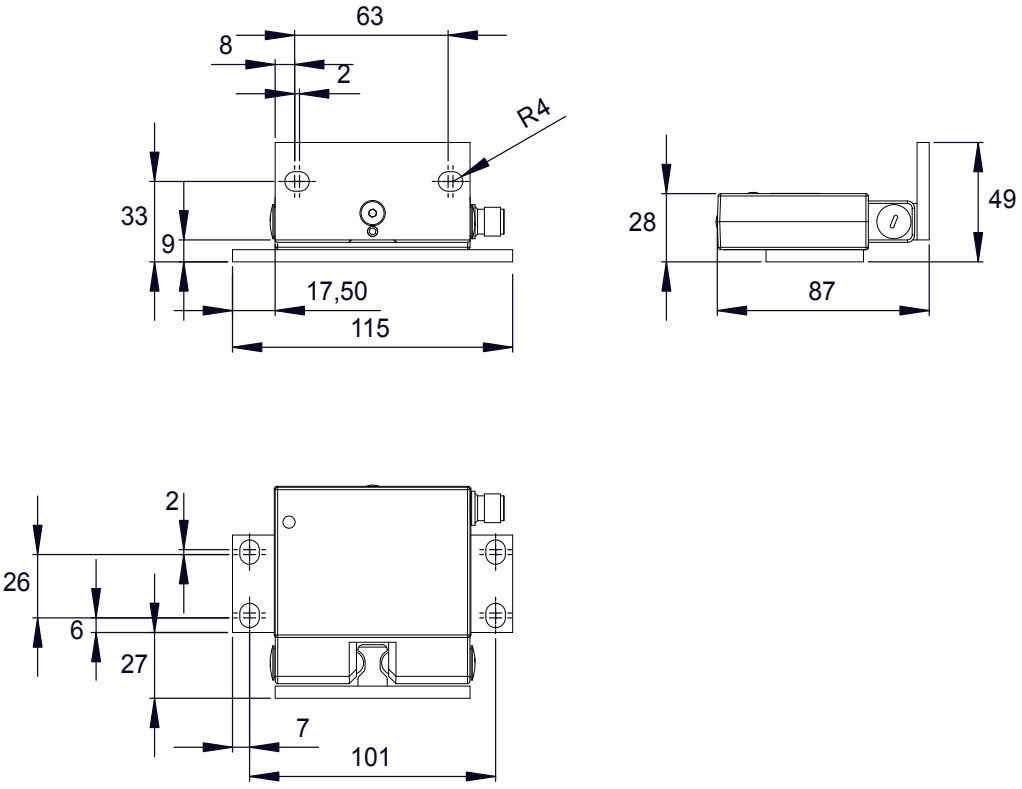
8 Assembly of Dalton and mounting bracket



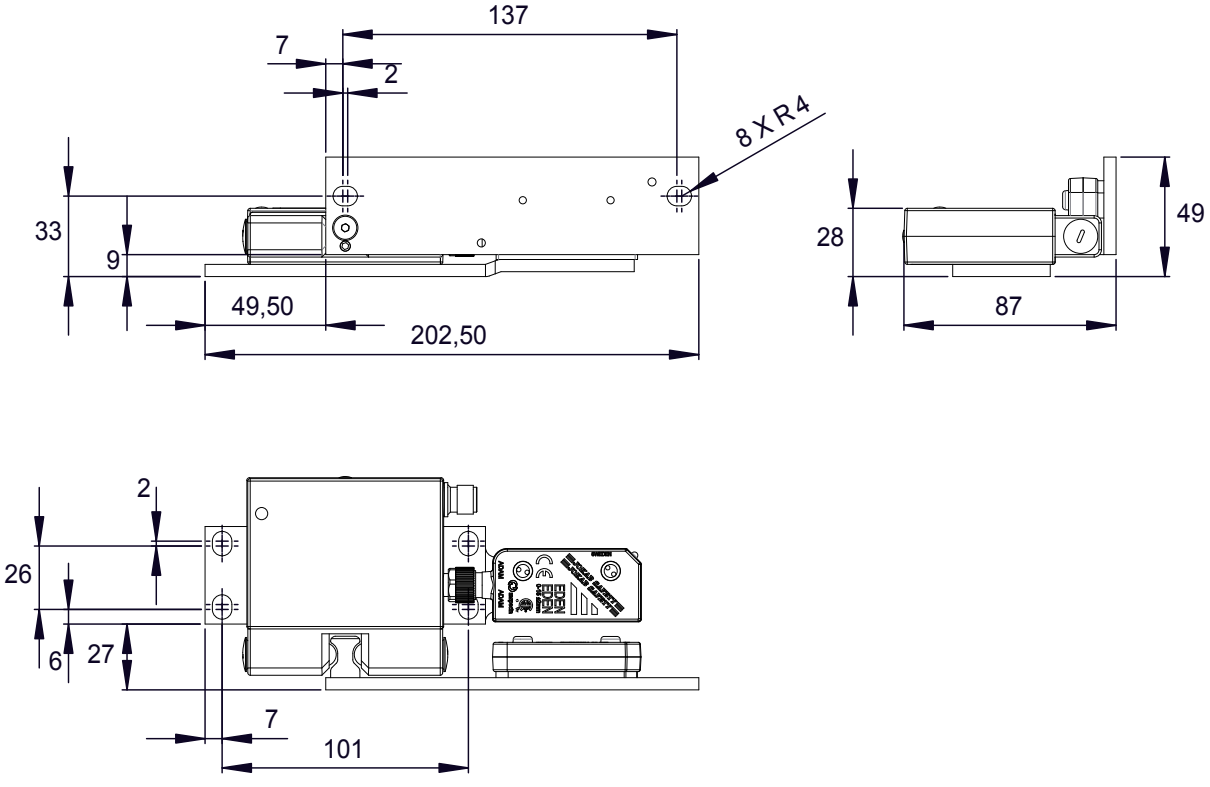
No.	Part	QTY.
1	Dalton	1
2	Tongue	1
3	Door bracket	1
4	M5x8	1
5	M5x16	1
6	Frame bracket	1
7	M4x16	4

9 Measurements

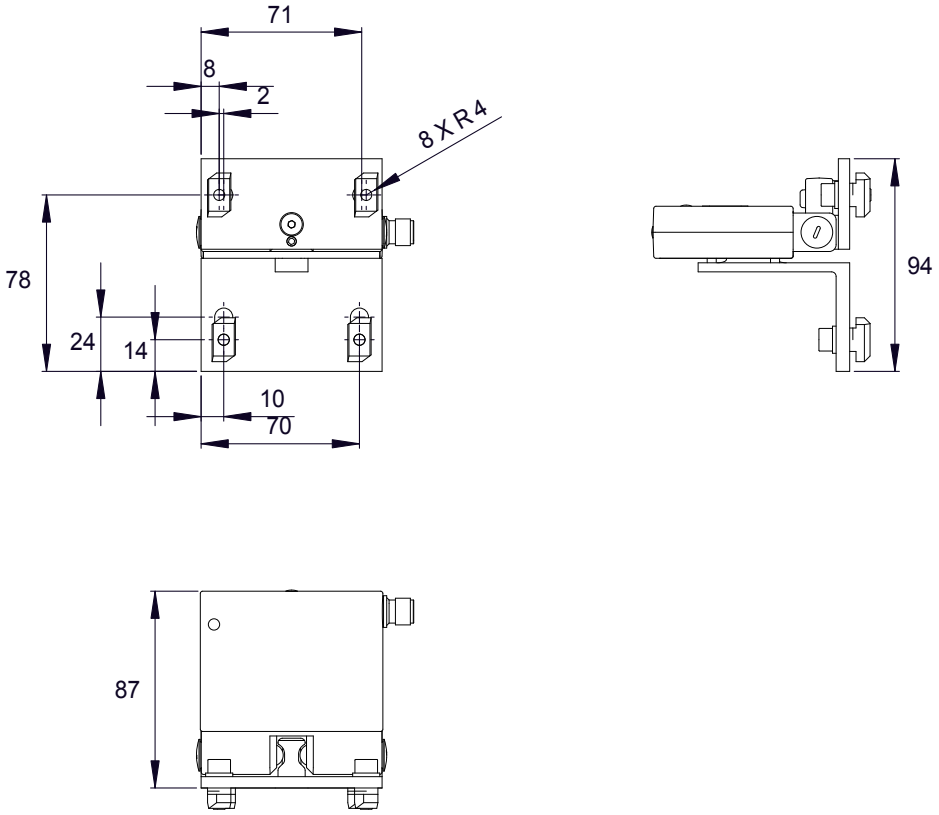
9.1 Dalton with bracket 1



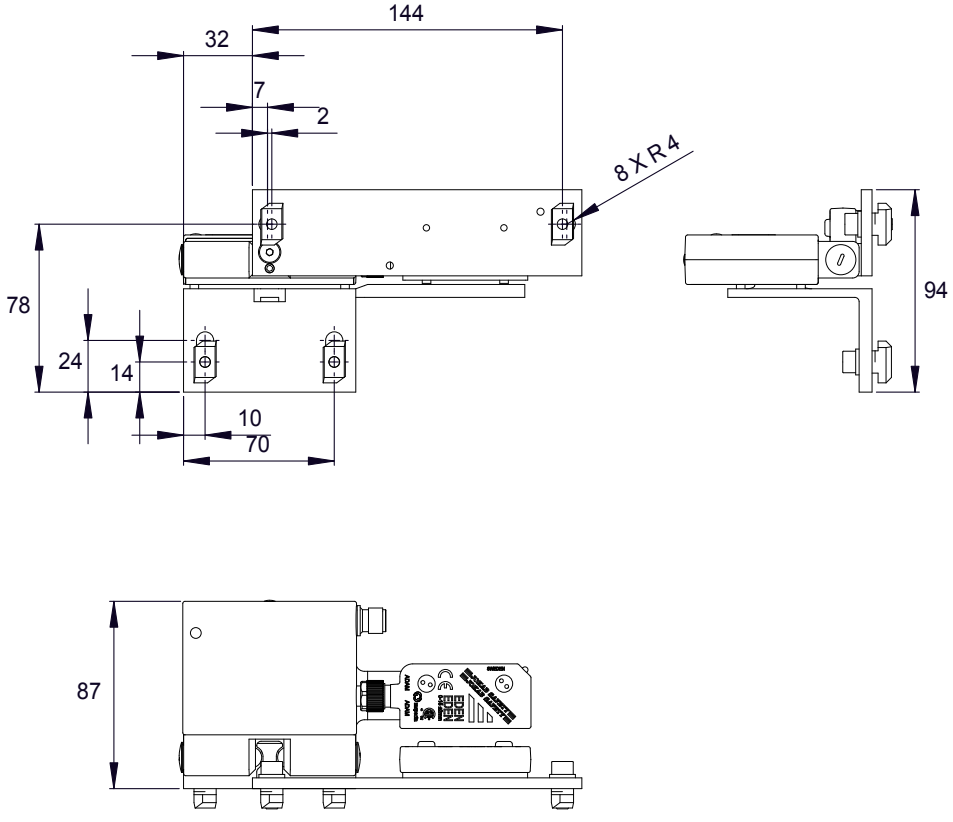
9.2 Dalton with bracket 2



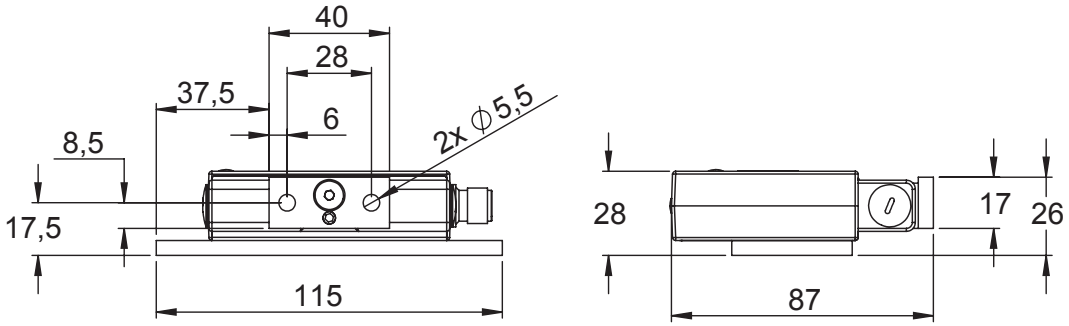
9.3 Dalton with bracket 3

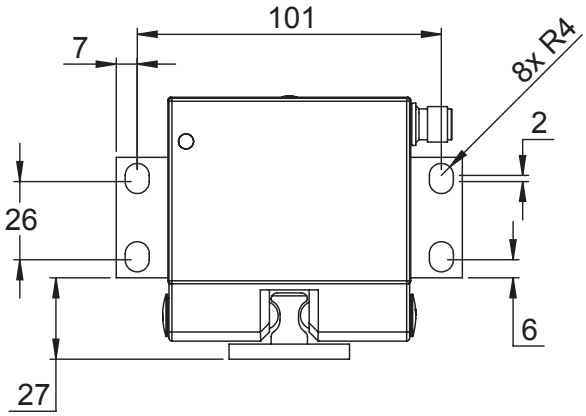


9.4 Dalton with bracket 4

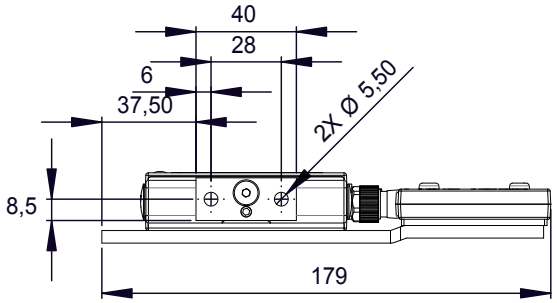


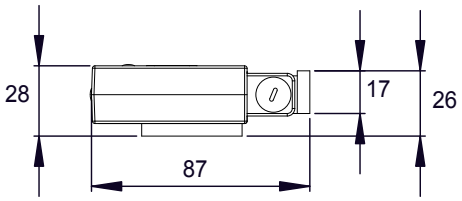
9.5 Dalton with bracket 5

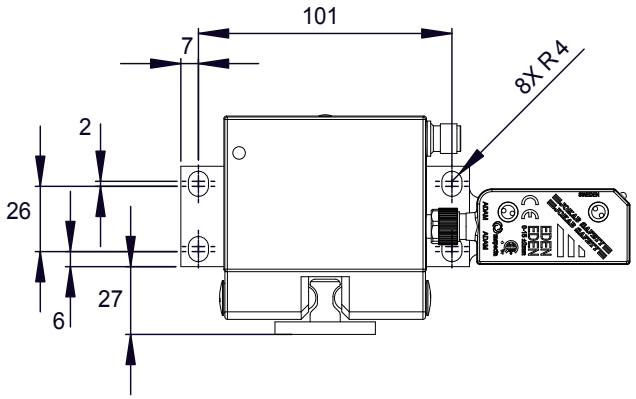




9.6 Dalton with bracket 6







10 Technical data

10.1 Indication and information

	Info	Explanation
G	1	Locked
G R	0	Closed, unlocked
R	0	Open
G	0	Dalton has not entered the unlocked state
R	0	Eden or ball-catch not in position
R	0	Open, locking is not permitted
R	0	The unit has not entered locked state
R G	0	Undervoltage - locking not permitted
R G	0	Overvoltage
R G	0	Overtemperature (>80°C)

G = Green
R = Red

10.2 Connectors

Connector to connect Dalton (varies depending on type)

Dalton L00: No connections
Dalton M11: 8-pole M12 male plug
Dalton M12: 8-pole M12 male plug + 5-pole M12 female receptacle for Adam
Dalton M31: 5-pole M12 male plug

10.3 Pins (colour markings)

Function	8-pole	Colour	5-pole	Colour
Dynamic input signal, Adam	1	White		
+24 VDC	2	Brown	1	Brown
Lock signal	3	Green	4	Black
Not used	4	Yellow	2	White
Information output, Adam	5	Grey		
Dynamic output signal, Adam	6	Pink		
0 VDC	7	Blue	3	Blue
Information output, Dalton	8	Red	5	Grey

10.4 Data

Manufacturer	ABB AB / JOKAB SAFETY Varlabergsvägen 11 SE-434 39 Kungsbacka SWEDEN
Locking function	M - Locked when energized L - Ball-catch only, no electrical functions
Colour	Black
Weight	See data for individual Dalton models
Operating voltage	24 VDC +25/-20%
Current consumption	
Unlocked	40 mA
Locked	130 mA
Lock input	5 mA
Information output	Max. 10 mA
Eden	See data for Eden[1]
Temperature range	-10°C to +55°C
Humidity range	35% - 85%
Protection class	IP67
Holding force	
Ball-catch	25-100 N
Locked	2000 N
Material	
Dalton body, brackets	Anodized aluminium
Lock tongue	Stainless steel
Resistance	
Stainless steel	Good resistance to most acids, except for hydrochloric and sulphuric acids
Anodized aluminium	Very good resistance against corrosion, good resistance to most acids

1. The Dalton process lock is not a safety device. The safety interlock switch Eden is a separate safety device. Please refer to the technical documentation for Eden for all safety performance values.

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